Physics of the Solid State 2016 vol.58 N3, pages 469-474

Study of the effects of hydroxyapatite nanocrystal codoping by pulsed electron paramagnetic resonance methods

Gafurov M., Biktagirov T., Mamin G., Shurtakova D., Klimashina E., Putlyaev V., Orlinskii S.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© Pleiades Publishing, Ltd., 2016.The effect of codoping of hydroxyapatite (HAP) nanocrystals with average sizes of 35 ± 15 nm during “wet” synthesis by CO_3^{2-} carbonate anions and Mn^{2+} cations on relaxation characteristics (for the times of electron spin–spin relaxation) of the NO_3^{2-} nitrate radical anion has been studied. By the example of HAP, it has been demonstrated that the electron paramagnetic resonance (EPR) is an efficient method for studying anioncation (co)doping of nanoscale particles. It has been shown experimentally and by quantummechanical calculations that simultaneous introduction of several ions can be energetically more favorable than their separate inclusion. Possible codoping models have been proposed, and their energy parameters have been calculated.

http://dx.doi.org/10.1134/S1063783416030094